ILLEGIB

Approved For Release 2009/01/06 : CIA-RDP85-00988R000500040020-2

SUGGESTION

I. The Problem

Energy conservation is a key national priority, yet the CIA headquarters building is a heat sieve designed and built in the era of cheap and inexhaustible energy. On the 1st, 3rd, 4th, 5th, and 6th floors there are nearly 3,500 windows, each one of which loses about 2.75 million btu's per heating season, requiring the burning of 25-28 gallons of heating oil per window per heating season. About 80 percent of this heat loss is pure waste. At today's oil prices of roughly $1-/gallon this amounts to a cost of $20/window/year or $70,000. Since heating oil prices promise to double in the next 2-3 years, savings would amount to about $150,000 per year in the mid 1980s. Summer air conditioning savings would also be sizeable, perhaps $50,000 to $75,000.

II. The Solution

Because of the large number of identical windows, it will be possible to mass produce styrofoam insulated shutters to fit on the inside of each of these windows. These shutters would not interfere with the operation of the windows or illumination during working hours, nor would they intrude on available space within agency offices. Closing of these shutters could be made a portion of the normal daily security check, thus assuring a 90 percent reduction in heat losses during the 75 percent of the week that most offices are normally unoccupied. Since heat losses are much higher at night than during the day, in part because of radiation losses, overall savings would average 80 percent or so.

III. The Shutters

These proposed shutters would hinge on each side of the windows on the inside and open against the concrete columns alongside each window, much like french or double doors. Shutter construction would probably call for a styrofoam core bonded to fibreglass or plastic sheets (much like high quality ice chests are manufactured) with weather stripped closures. Design should aim at an "R" value of 8 to 10 per shutter, implying a core

thickness of about 1 1/2". Based on a competitive bid order of some 3,500 units, costs should run less than $50- per unit. Installation costs should not exceed an additional $50 per unit. A particularly cheap, but less esthetically pleasing solution could be obtained by using lift out styrofoam panels with magnetic catches that would seal on the window frames. This could probably be done for as little as $10-$20 per window, with a payback period of less than one heating season. These lift-out panels would also be useable on the 2nd and 7th floors.

IV. The Payoff

With annual savings on heat alone of $20-/window (probably $30-$40/window taking into account air conditioning savings and the probable rise in fuel costs during the interim) payback could be obtained in 3 years or less. Total annual savings would total at least $100,000 next year in heating costs and more than $150,000-/year during the 1980s. Other conservation investments could be made on the 2nd and the 7th floor where heat losses through the windows are greater even than on the other floors. Again, insulated shutters of some kind probably offer the best solution. Double glazing would be more expensive and would save only about 50 percent at best, compared to the 80 percent or so available from shutters. As for the cafeteria, which is an energy disgrace, no solution suggests itself. For your information, it probably takes more energy to heat this area than it does for the entire rest of the headquarters complex.

Appendix A

Heat Loss Calculations

Each window on 3rd, 4th, 5th, & 6th floors

Heat Loss by Conduction

Dimensions 2.7' x 7'5'

Glass Area 20.6 ft^2/window

Heating Degree Days - Washington DC = 4,200

Langley, Va = 4,500

= 4,500 x 24 hrs x 20.6 x 1.13

= 2,514,024 btu's/window/heating season

Heat Loss Through Infiltration

Along window edge length (crack) at assumed average winter wind velocity of 5 mph

15' crack/window/

infiltration = 8 ft^3/hour/linear foot

Total infiltration equals 120 ft^3/hour, or

518,000 ft^3/heating season

Heat Loss = 518,000 x 25°F (average ΔT)

x 0.018 btu/ft^3/°F

= 233,100 btu's/window/heating season

Total heat loss per window = 2,750,000 btu's

P&PS

SUBJECT:

18 APR 1980

Distribution:

STAT MEMORANDUM FOR: [redacted]
ODP Member, Agency Energy Committee

FROM: James H. McDonald
Director of Logistics

SUBJECT: Heat Generated by Computers

REFERENCES: A. Memo for C/AEC/OL, from ODP Mbr AEC, dtd. 30 Jan 80, same subj: (ODP-0-127; OL 0 0577)

B. Memo for DC/RECD/OL, from C/RECD/OL, dtd. 25 Mar 80, same subj: (OL01424)

1. The reference raises the question, "Can the heat generated by computers be used to at least warm up the 'hot' water if the boiler system is discontinued?" The question is a sub-set of a more global consideration -- How can the nation utilize heat that is thrown away, wasted? Waste heat exists because of the past availability of cheap energy and, because it does exist, it may now be collected, concentrated and used, but at considerable expense. As you know, the RE&CD/OL and the GSA are working to prioritize projects to conserve energy, including the use of waste heat. The priorities for projects are necessary because energy saving opportunities are legion in numbers, but resources are finite, and presently small.

STAT 2. Reference B specifically addresses [redacted] suggestion and identifies that it is not economical or practical to consider computer "waste" heat for our domestic hot water at this time. This suggestion, along with numerous other suggestions concerning energy conservation, will be discussed at the next committee meeting.

/s/ James H. McDonald

James H. McDonald

Attachments:
A. Reference A
B. Reference B

OL 0 0577a

ODP-0-127
30 JAN 1980

MEMORANDUM FOR: Chairman, Agency Energy Committee
Office of Logistics

STAT FROM : [redacted]
ODP Member, Agency Energy Committee

SUBJECT : Use of Heat Generated by Computers

STAT Attached is a suggestion from [redacted] a member of the ODP Training Staff. The suggestion is forwarded for consideration by the Agency Energy Committee and it raises the question, "Can the heat generated by computers be used to at least warm up the "hot" water if the boiler system is discontinued?".

STAT [redacted]
Chief, Management Staff, ODP

Attachment: a/s

STAT cc: [redacted]

0577

SPEED LETTER	REPLY REQUESTED	DATE
	X YES ___ NO	22 January 1980
		LETTER NO.

TO : Chief, ODP Management Staff

STAT ATTN:

STAT FROM: ODP, Training Staff, 3D54

Re: "Use of heat generated by computers"

1. I understand HQ is considering disbanding the major boiler system. The effect, of course, will be to render the "H" on the water faucets meaningless.

2. Can the heat generated by computers be used to at least warm up the "hot" water if the boiler system is discontinued?

STAT

SIGNATURE

REPLY DATE 30 JAN 1980

Thank you for your suggestion. It has been forwarded to the Chairman of the Agency Energy Committee for consideration.

STAT

ODP Member
Agency Energy Committee

STAT

SIGNATURE

FORM 5-67 1831 USE PREVIOUS EDITIONS

UNCLASSIFIED ☐ USE ONLY ☐ CONFIDENTIAL ☐ SECRET

ROUTING AND RECORD SHEET

SUBJECT: (Optional)

Use of Heat Generated by Computers

FROM:

STAT

C/MS/ODP
2D0105, Hqs.

EXTENSION | NO.

DATE

TO: (Officer designation, room number, and building)	DATE RECEIVED	DATE FORWARDED	OFFICER'S INITIALS	COMMENTS (Number each comment to show from whom to whom. Draw a line across column after each comment.)
1. C/AEC/OL 3F15C, STAT				
2. STAT		5 FEB 80		
3. C/IPS/OL				action / response pls.
4.				
5. DC/RECD STAT		3/7		
6. C/HEB		3/29		(RECD) Do you want to answer this suggestion?
7. C/PTPS/OL				
8. STAT				
9. STAT				5 & 6 Elim comment / action -
10.				
11.				
12.				
13.				
14.				
15.				

RECD
C
DC
EX
SA
C/REB
RO
C/FEngB
PE
C/HEB
PE
FILE
13 FEB 1980

OL U 0577

FORM 5-62 610 USE PREVIOUS EDITIONS ☐ SECRET ☐ CONFIDENTIAL ☐ INTERNAL USE ONLY ☑ UNCLASSIFIED

25 MAR 1980

MEMORANDUM FOR: Deputy Chief, Real Estate & Construction Division, OL

STAT FROM: [redacted]
Chief, Headquarters Engineering Branch, RECD/OL

SUBJECT: Use of Computer Room Heat to Warm the Domestic Water

REFERENCE: Memo ODP-0-127, 30 Jan 80, subj as above

DC
EX
C/REB
RE
C/FEMB
PE
C/HEB
PE
FILE

28 MAR

1. The heat given off by the various computer and communications systems is presently removed from those systems by air handlers served by chilled water which is produced in the Powerplant about a thousand feet west of the Headquarters Building. Essentually the computer heat is transferred to the air in the computer room which in turn is transferred to the chilled water system, raising the chilled water from approximately 45°F to about 55°F. The chilled water is then pumped to the Powerplant to a chiller where the heat is transferred to an evaporative cooling tower for a discharge to the atmosphere. In this entire cycle, the only "warm" medium is the water circulated from the chiller to the evaporative cooling tower at the Powerplant. And this water only reaches a temperature range of 85°F to 90°F.

2. The domestic hot water in the Headquarters Building is generated by taking part of the main water supply to the building and heating it using steam heat exchangers. The heat exchangers are located in mechanical equipment areas with each exchanger servicing a particular part of the building.

3. Under this design arrangement the heat removed from the computer rooms does not become concentrated in any amount that would be considered "warm" until it reaches the Powerplant and at that point it is too far away to be useable to warm part of the main water supply.

OL 0 1424

SUBJECT: Use of Computer Room Heat to Warm the Domestic Water

4. Two more factors should also be discussed. First, the only consideration I am aware of that would alter the present boiler operation plan of continuous service is the preliminary examination of a project to install small "summer" boilers to serve the Headquarters cafeteria and Printing and Photography Building and to install electric hot water heaters for scattered photo processors, medical services, and similar requirements. The goal of this project would be to supply the small minimum hot water requirements while allowing the large boilers in the Powerplant to be secured. This would be seasonal for possibly to period of July through August. No energy would be used to heat general domestic water under this plan during the July - August period.

5. Second, during the summer the domestic water temperature tends to rise naturally into the low to middle 70's which is not hot but is possibly acceptable for rest room room purposes.

6. I hope the above information will help Messers Orwig and Brown to understand our present system and encourage them to continue to look for ways to save energy.

STAT